

WHAT IS CLAIMED IS:

1. A method for managing a primary bit stream and an additional bit stream comprising:
 - 5 converting a q-bit/r-bit (qB/rB) encoded bit stream into an x-bit/y-bit (xB/yB) encoded bit stream; and
 - multiplexing bits of said additional bit stream with yB code-words of said xB/yB encoded bit stream.
- 10 2. The method of claim 1 wherein converting a qB/rB encoded bit stream into an xB/yB encoded bit stream includes:
 - receiving rB code-words of said qB/rB encoded bit stream;
 - decoding said rB code-words to qB words;
 - identifying xB words from said qB words; and
 - 15 encoding said xB words into yB code-words.
3. The method of claim 1 wherein multiplexing said yB code-words with said additional bit stream includes:
 - identifying a yB code-word, said yB code-word being related to a particular xB
 - 20 word of said xB/yB encoded bit stream;
 - identifying a bit of said additional bit stream; and
 - selecting a yB code-word to represent said bit of said additional bit stream,
 - wherein said yB code-word is selected from a group of yB code-words that are used individually to represent said particular xB word.

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4. The method of claim 3 wherein multiplexing bits of said additional bit stream with yB code-words further includes:

identifying another yB code-word, said another yB code-word being related to another xB word of said xB/yB encoded bit stream; and

5 selecting a yB code-word in response to a DC balance characteristic of said xB/yB encoded bit stream, wherein said yB code-word is selected from a group of yB code-words that are used individually to represent said another xB word.

5. The method of claim 3 wherein each group of yB code-words includes at least one
10 yB code-word that belongs to a category of yB code-words that tends to exhibit positive DC balance and at least one yB code-word that belongs to a category of yB code-words that tends to exhibit negative DC balance.

6. The method of claim 5 wherein yB code-words from said category of yB code-
15 words that tends to exhibit positive DC balance are used to represent one bits and wherein yB code-words from said category of yB code-words that tends to exhibit negative DC balance are used represent zero bits.

7. The method of claim 3 wherein one yB code-word, from said group of yB code-
20 words that are used individually to represent said xB word, represents a high bit and another yB code-word, from said group of yB code-words that are used individually to represent said xB word, represents a low bit.

8. The method of claim 1 further including transmitting said multiplexed bit stream
25 across a network link.

9. The method of claim 8 further including receiving said yB code-words, and demultiplexing bits of said additional bit stream from said yB code-words.

10. The method of claim 9 wherein demultiplexing includes identifying said yB code-words as belonging to a category of code-words that tends to exhibit positive DC balance or a category of code-words that tends to exhibit negative DC balance.

5 11. The method of claim 1 wherein said qB/rB encoded bit stream is a 4B/5B encoded bit stream and said xB/yB encoded bit stream is an 8B/10B encoded bit stream.

12. The method of claim 11 wherein said 4B/5B encoding and said 8B/10B encoding are defined by the IEEE 802.3 standard.

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13. The method of claim 2 wherein identifying xB words of said primary bit stream from said qB words includes combining multiple qB words to form said xB words.

14. The method of claim 3 wherein said step of selecting said yB code-word includes
15 selecting from a translated set of unique yB code-words when said xB word is represented, according to a known xB/yB encoding standard, by a single yB code-word.

15. The method of claim 14 wherein said known xB/yB encoding standard is defined by the IEEE 802.3 standard.

16. A method for managing a primary bit stream and an additional bit stream comprising:

receiving r-bit (rB) code-words of said primary bit stream, wherein said primary bit stream is encoded into a q-bit/r-bit (qB/rB) encoded bit stream;

5 decoding said primary bit stream from said rB code-words to q-bit (qB) words;

identifying x-bit (xB) words of said primary bit stream from said qB words;

encoding said xB words of said primary bit stream into y-bit (yB) code-words to form an x-bit/y-bit (xB/yB) encoded bit stream; and

10 multiplexing said yB code-words with said additional bit stream to form a multiplexed bit stream.

17. The method of claim 16 wherein multiplexing said yB code-words with said additional bit stream includes:

15 identifying a yB code-word of said primary bit stream, said yB code-word being related to a particular xB word of said primary bit stream;

identifying a bit of said additional bit stream; and

selecting a yB code-word to represent said bit of said additional bit stream, wherein said yB code-word is selected from a group of yB code-words that are used individually to represent said particular xB word.

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18. The method of claim 17 wherein multiplexing said yB code-words with said additional bit stream further includes:

identifying another yB code-word of said primary bit stream, said another yB code-word being related to another xB word of said primary bit stream; and

25 selecting a yB code-word in response to a DC balance characteristic of said xB/yB encoded bit stream, wherein said yB code-word is selected from a group of yB code-words that are used individually to represent said another xB word.

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19. The method of claim 17 wherein each group of yB code-words includes at least one yB code-word that belongs to a category of yB code-words that tends to exhibit positive DC balance and at least one yB code-word that belongs to a category of yB code-words that tends to exhibit negative DC balance.

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20. The method of claim 19 wherein yB code-words from said category of yB code-words that tends to exhibit positive DC balance are used to represent one bits and wherein yB code-words from said category of yB code-words that tends to exhibit negative DC balance are used represent zero bits.

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21. The method of claim 17 wherein one yB code-word, from said group of yB code-words that are used individually to represent said xB word, represents a high bit and another yB code-word, from said group of yB code-words that are used individually to represent said xB word, represents a low bit.

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22. The method of claim 16 further including transmitting said multiplexed bit stream across a network link.

23. The method of claim 22 further including receiving a yB code-word of said multiplexed bit stream, and demultiplexing said bit of said additional bit stream from said yB code-word.

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24. The method of claim 23 wherein demultiplexing includes identifying said yB code-word as belonging to a category of code-words that tends to exhibit positive DC balance or a category of code-words that tends to exhibit negative DC balance.

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25. The method of claim 16 wherein said qB/rB encoded bit stream is a 4B/5B encoded bit stream and said xB/yB encoded bit stream is an 8B/10B encoded bit stream.

26. The method of claim 25 wherein said 4B/5B encoding and said 8B/10B encoding are defined by the IEEE 802.3 standard.

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27. The method of claim 16 wherein identifying xB words of said primary bit stream from said qB words includes combining multiple qB words to form said xB words.

28. The method of claim 17 wherein said step of selecting said yB code-word
5 includes selecting from a translated set of unique yB code-words when said xB word is represented, according to a known xB/yB encoding standard, by a single yB code-word.

29. The method of claim 28 wherein said known xB/yB encoding standard is defined by the IEEE 802.3 standard.

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30. A method for managing a primary bit stream and an additional bit stream comprising:
demultiplexing bits of said additional bit stream from y-bit (yB) code-words of an
x-bit/y-bit (xB/yB) encoded bit stream; and

5 converting said xB/yB encoded bit stream into a q-bit/r-bit (qB/rB) encoded bit
stream.

31. The method of claim 30 wherein converting said xB/yB encoded bit stream into a
qB/rB encoded bit stream includes:

10 decoding said yB code-words into xB words;
identifying qB words from said xB words; and
encoding said qB words into rB code-words.

32. The method of claim 30 wherein demultiplexing includes identifying said yB code-
words as belonging to a category of code-words that tends to exhibit positive DC balance
15 or a category of code-words that tends to exhibit negative DC balance.

33. The method of claim 32 wherein yB code-words belonging to said category of code-
words that tends to exhibit positive DC balance represent one of high bits and low bits
and yB code-words belonging to said category of code-words that tends to exhibit
20 negative DC balance represent one of high bits and low bits, wherein only one of said
two categories represents high bits and the other one of said two categories represents
low bits.

34. The method of claim 30 wherein said qB/rB encoded bit stream is a 4B/5B encoded
25 bit stream and said xB/yB encoded bits stream is an 8B/10B encoded bit stream.

35. The method of claim 34 wherein said 4B/5B encoding and said 8B/10B encoding are
defined by the IEEE 802.3 standard.

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36. A method for managing a primary bit stream and an additional bit stream comprising:

receiving a multiplexed bit stream that includes y-bit (yB) code-words of said primary bit stream and bits of said additional bit stream, wherein said primary bit stream is encoded into an x-bit/y-bit (xB/yB) encoded bit stream;

5 demultiplexing said multiplexed bit stream into separate streams of yB code-words and bits of said additional bit stream;

decoding said yB code-words into x-bit (xB) words;

identifying q-bit (qB) words from said xB words;

encoding said qB words into r-bit (rB) code-words to form a q-bit/r-bit (qB/rB)

10 encoded bit stream.

37. The method of claim 36 wherein demultiplexing includes identifying said yB code-words as belonging to a category of code-words that tends to exhibit positive DC balance or a category of code-words that tends to exhibit negative DC balance.

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38. The method of claim 37 wherein yB code-words belonging to said category of code-words that tends to exhibit positive DC balance represent one of high bits and low bits and yB code-words belonging to said category of code-words that tends to exhibit negative DC balance represent one of high bits and low bits, wherein only one of said
20 two categories represents high bits and the other one of said two categories represents low bits.

39. The method of claim 36 wherein said qB/rB encoded bit stream is a 4B/5B encoded bit stream and said xB/yB encoded bits stream is an 8B/10B encoded bit stream.

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40. The method of claim 39 wherein said 4B/5B encoding and said 8B/10B encoding are defined by the IEEE 802.3 standard.

41. A system for managing a primary bit stream and an additional bit stream comprising:

means for converting a q-bit/r-bit (qB/rB) encoded bit stream into an x-bit/y-bit (xB/yB) encoded bit stream; and

5 means for multiplexing said additional bit stream with said xB/yB encoded bit stream, said multiplexing resulting in a multiplexed bit stream.

42. The system of claim 41 wherein said means for converting includes means for:

receiving rB code-words of said qB/rB encoded bit stream;

decoding said rB code-words to qB words;

10 identifying xB words from said qB words; and

encoding said xB words into yB code-words.

43. The system of claim 41 wherein said means for multiplexing includes:

15 a first input for receiving a first yB code-word that is related to a first xB word of said primary bit stream and for receiving a second yB code-word that is related to a second xB word of said primary bit stream;

a second input for receiving a first bit of said additional bit stream; and

20 means for manipulating said first yB code-word to represent said first bit of said additional bit stream, wherein manipulating said first yB code-word includes selecting a yB code-word from a group of yB code-words that are used individually to represent said first xB word, and for manipulating said second yB code-word to balance the running disparity of said encoded bit stream, wherein manipulating said second yB code-word includes selecting a yB code-word from a group of yB code-words that are used individually to represent said second xB word.

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44. The system of claim 43 wherein each group of yB code-words includes at least one yB code-word that belongs to a category of yB code-words that tends to exhibit positive DC balance and at least one yB code-word that belongs to a category of yB code-words that tends to exhibit negative DC balance.

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45. The system of claim 44 wherein yB code-words from said category of yB code-words that tends to exhibit positive DC balance are used to represent one bits and wherein yB code-words from said category of yB code-words that tends to exhibit negative DC balance are used represent zero bits.

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46. The system of claim 43 wherein one yB code-word, from said group of yB code-words that are used individually to represent said first xB word, represents a high bit and another yB code-word, from said group of yB code-words that are used individually to represent said first xB word, represents a low bit.

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47. The system of claim 41 further including means for demultiplexing said first bit of said additional bit stream from said first yB code-word.

48. The system of claim 47 wherein said means for demultiplexing includes means for identifying said first yB code-word as belonging to a category of code-words that tends to exhibit positive DC balance or a category of code-words that tends to exhibit negative DC balance.

49. The system of claim 41 wherein said qB/rB encoding is 4B/5B encoding and said xB/yB encoding is 8B/10B encoding.

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50. The system of claim 49 wherein said 4B/5B encoding and said 8B/10B encoding is defined by the IEEE 802.3 standard.

51. The system of claim 43 wherein manipulating said first yB code-word includes selecting from a translated set of unique yB code-words when said first xB word is represented, according to a known xB/yB encoding standard, by a single yB code-word.

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52. The method of claim 51 wherein said known xB/yB encoding standard is defined by the IEEE 802.3 standard.

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53. A system for managing a primary bit stream and an additional bit stream comprising:

means for demultiplexing bits of said additional bit stream from y-bit (yB) code-words of an x-bit/y-bit (xB/yB) encoded bit stream; and

means for converting said xB/yB encoded bit stream into a q-bit/r-bit (qB/rB) encoded bit stream.

54. The system of claim 53 wherein said converting means includes means for:

decoding said yB code-words into xB words;

identifying qB words from said xB words; and

encoding said qB words into rB code-words.

55. The system of claim 53 wherein said means for demultiplexing includes means for identifying said yB code-words as belonging to a category of code-words that tends to exhibit positive DC balance or a category of code-words that tends to exhibit negative

DC balance.

56. The system of claim 55 wherein yB code-words belonging to said category of code-words that tends to exhibit positive DC balance represent one of high bits and low bits and yB code-words belonging to said category of code-words that tends to exhibit negative DC balance represent one of high bits and low bits, wherein only one of said two categories represents high bits and the other one of said two categories represents low bits.

57. The system of claim 53 wherein said qB/rB encoded bit stream is a 4B/5B encoded bit stream and said xB/yB encoded bits stream is an 8B/10B encoded bit stream.

58. The system of claim 57 wherein said 4B/5B encoding and said 8B/10B encoding are defined by the IEEE 802.3 standard.